

US-PAT-NO: 6625174

DOCUMENT-IDENTIFIER: US 6625174 B1

TITLE: Method for transmitting data packets on carrier  
frequency with linear variation and transmitter  
implementing this method

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Brief Summary Text - BSTX (11):

By using, for the information field, a signal at a carrier frequency which varies according to a linear ramp, this purpose is achieved by modulating the said signal via several subcarriers rather than via one subcarrier, these subcarriers being, themselves, modulated by the data to be transmitted according to a technique of orthogonal frequency division multiplexing, generally referred to as the OFDM technique after its initials. It should be noted that, in what follows, the OFDM technique covers both straightforward OFDM and coded OFDM also referred to as the COFDM technique after its initials; it is recalled in this regard that, considering a binary train, in the OFDM technique the symbols are transmitted in groups of N symbols with N an integer greater than one, respectively on N subcarriers and during a time equal to the time to receive the N symbols. It is recalled that the COFDM technique is merely a variant of the OFDM technique in the sense that, in the COFDM technique, there is moreover associated a coding function which makes it possible to obtain, starting from the N input symbols, N outputs each composed of a weighting of the N input symbols.

Brief Summary Text - BSTX (12):

According to the invention there is proposed a process for transmitting data in packets, these packets comprising a header at a first carrier frequency, followed by an information field at a second carrier frequency, the start of transmission of the field being tied to the start of transmission of the header of the corresponding packet, characterized in that it consists, for the transmission of the field, in using N, with N an integer greater than 1, distinct and simultaneous subcarriers, in splitting the data to be transmitted in the field into successive groups of N symbols, in assigning the N symbols respectively to the N subcarriers by OFDM multiplexing and in modulating these

*parallel*

N subcarriers respectively by these N symbols so as to obtain a modulating signal made of the N subcarriers thus modulated, in generating a signal at the second carrier frequency varying over time according to a linear ramp, in modulating the signal at the second carrier frequency by the modulating signal, and, on reception, in mixing the signal corresponding to the information field with a ramp-like signal similar to the signal at the second carrier frequency so as to obtain a signal corresponding to the modulating signal and to extract therefrom the data of the information field.

#### Brief Summary Text - BSTX (13):

According to the invention there is proposed a transmitter for implementing the process, characterized in that it comprises means for computing groups of symbols representative of the data to be transmitted in a field, first means of modulation by the OFDM technique for computing N, with N an integer greater than 1, subcarriers modulated by the groups so as to generate a modulating signal, a ramp generator for generating a carrier signal whose frequency varies over time according to a linear ramp and second means of modulation for receiving the signals generated by the first means of modulation and the ramp generator and for performing a modulation.

#### Claims Text - CLTX (3):

3. A transmitter for transmitting data in packets, the packets comprising a header at a first carrier frequency, followed by an information field at a second carrier frequency, a start of transmission of the information field being tied to a start of transmission of the header of the corresponding packet, wherein the transmitting comprises using N distinct and simultaneous subcarriers for transmission in the information field, where N is an integer greater than 1, splitting the data to be transmitted in the information field into successive groups of N symbols, assigning the N symbols respectively to the N subcarriers by OFDM multiplexing, modulating the N subcarriers respectively by the N symbols thereby obtaining a modulating signal made of the N subcarriers, generating a signal at the second carrier frequency varying over time according to a linear ramp, modulating the signal at the second carrier frequency by the modulating signal, and mixing the signal, upon reception, corresponding to the information field with a ramp signal corresponding to the signal at the second carrier frequency to obtain a signal corresponding to the modulating signal and to extract from the signal data of the information field, the transmitter comprising: a computing device, configured to compute groups of symbols representative of data to be transmitted in a field; a first modulator, configured to generate a modulating signal by OFDM for the N subcarriers; a ramp generator configured to generate a carrier signal, wherein

the carrier signal has a frequency variant over time according to a linear ramp for optimizing bandwidth use; and second modulator, configured to receive signals generated by the first modulator and the ramp generator.

Claims Text - CLTX (5):

5. A receiver for transmitting data in packets, the packets comprising a header at a first carrier frequency, followed by an information field at a second carrier frequency, a start of transmission of the information field being tied to a start of transmission of the header of the corresponding packet, wherein the transmitting comprises using N distinct and simultaneous subcarriers for transmission in the information field, where N is an integer greater than 1, splitting the data to be transmitted in the information field into successive groups of N symbols, assigning the N symbols respectively to the N subcarriers by OFDM multiplexing, modulating the N subcarriers respectively by the N symbols thereby obtaining a modulating signal made of the N subcarriers, generating a signal at the second carrier frequency varying over time according to a linear ramp, modulating the signal at the second carrier frequency by the modulating signal, and mixing the signal, upon reception, corresponding to the information field with a ramp signal corresponding to the signal at the second carrier frequency to obtain a signal corresponding to the modulating signal and to extract from the signal data of the information field, the receiver comprising: a mixer, comprising: a first input for receiving a signal; a second input; and an output; a ramp generator, wherein the ramp generator is configured to deliver a signal having a frequency variant over time according to a linear ramp, for optimizing bandwidth use, to the second output of the mixer; a frequency time/operator; and a subcarrier demodulation circuit.